



**General Certificate of Secondary Education
June 2012**

**Science B
(Specification 4500)**

SCB2HP

Unit 2: My Family and Home

Report on the Examination

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Set and published by the Assessment and Qualifications Alliance.

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GCSE Science B

SCB2HP

General Comments

Students and teachers should realise the importance of following the instruction to use black ink. They should also realise that if the work is illegible with poorly formed letters and numerals examiners may not be able to interpret what is written and so not be able to award marks. Where an answer space is given for numerical questions students should write their answer in the space provided: if their answer is buried in a maze of calculations it may well be missed. A calculator is essential for this unit.

Question 1 ((a), (b) (i) Standard demand / (b) (ii) High demand)

- (a) Some students were unfamiliar with the labelling of this diagram and often used appropriate labels but in the wrong place. ‘Stimulus’ was often given instead of ‘receptor’ and ‘central nervous system’ instead of ‘relay neurone’
- (b) (i) The three key points required in this answer are:
1. The function of the receptor in producing a nerve **impulse** in response to the stimulus of the hot pan.
 2. The conduction of the **impulse** through **neurones**.
 3. The contraction of the muscle to produce the response of withdrawing the finger.
- Whilst there are a number of ways of writing this answer, the use of ‘message’ and ‘signal’ are not appropriate alternatives for ‘impulse’. ‘Shock waves’, ‘pain’ and ‘heat’ were all seen as suggestions of what travelled along neurones. The indiscriminate use of ‘it’ is to be discouraged as the meaning is often unclear (eg ‘The receptor detects heat and it is sent’) A large proportion of responses were not clearly written.
- (b) (ii) Most students made correct reference to the brain not being involved with thinking about the initial response, so reducing the time taken.

Question 2 (Standard demand)

- (a) This question was structured to help the student with their description of the sequence of events in the production of electricity in a power station. It was surprising how poor some of the responses were, demonstrating little knowledge and understanding of the process. Students should be encouraged to learn that to refer to ‘**energy** being **made**’ is incorrect.
- (a) (i) Both the name of the part and its function were required for the mark. A number of answers were acceptable here for the name of the part. The function was to produce steam (from water). A number of students incorrectly suggested that gas from coal was produced to turn the turbine.

- (a) (ii) Students needed to correctly name the turbine ('fan' is insufficient) and convey the idea of converting the movement of the steam into rotation to turn the generator. 'Move' was not accepted for 'rotate'. This question was poorly answered.
- (a) (iii) Just under half of the students were able to answer this part correctly, and there were a number of incorrect responses. These included 'battery', 'transformer', 'energy box', and other incorrectly sited power station parts.
- (a) (iv) 'Stepper upper', 'power upper' and 'electricity upgrader', were among the more inventive suggestions by students who did not know the answer, even though a very large clue to the function was given in the diagram. Only about a quarter of students gained this mark.
- (b) (i) Most students were able to give the correct answer to this question. The small number who did not gain the mark either gave 15.96 (p) as the answer without putting the £ in front of it, or wrote digits that were illegible.
- (b) (ii) Students often failed to gain this mark because they ignored the decimal fraction and wrote '31', which is incorrect, or gave an incorrect rounding. This is unfortunate when students clearly knew how to calculate a percentage.
- (b) (iii) Students who showed their working out frequently got 1 mark for calculating that the microwave cost 45p a week to use, even though they could get no further with the calculation. Often the calculation was not clearly laid out, meaning intermediate stages in the calculation could not be awarded any marks.
- (c) Students failed to realise that the time for a unit of electricity is one hour, and this resulted in completely unrealistic values for the power of the kettle. Students who did realise this often incorrectly gave 30 minutes as 0.3 hours.

Question 3 (Standard demand)

When answering Quality of Written Communication questions students need to read the question carefully and think about their response before putting pen to paper. Jotting down a brief outline could help.

Responses to this question rarely commented upon the results table, dealing only with the practical method. Good and bad points were often jumbled together because of a lack of initial thought and planning. To gain higher marks students were required to give a scientifically correct justification for the point chosen. The colour differences of the surfaces, for example, being a bad feature because 'black absorbs (not attracts!) heat better than the others'.

Question 4 ((a), (b) Standard demand / (c) High demand)

- (a) About half of students were able to answer this question correctly.
- (b) The majority of students gained 1 mark for saying that the loudspeaker vibrates. Few went on to describe how these vibrations push and pull on the air (causing compression and rarefaction in the air) to produce the sound wave.
- (c) The most common error was to fail to convert the wavelength to metres, which would allow a maximum of only 2 marks for an otherwise correct calculation. Very few students gave the correct unit, most giving no unit at all. However, most students managed to gain at least 1 mark.

Question 5 (High demand)

Most students were able to gain at least one mark on this question. To gain full marks both advantages and disadvantages of wind turbines had to be given. Only a minority of students gave a formal opinion to their discussion. Students need to be aware that any suggestion that energy is created is incorrect, and that wind is the renewable energy resource, not the actual turbine.

Question 6 (High demand)

- (a) This question was answered correctly by about a third of students.
- (b) Fewer than half of the students gained the mark for this question. 'A molecule containing carbon and hydrogen' is incomplete, as it refers to many compounds other than hydrocarbons. The addition of the word 'only' would make it correct.
- (c) It was encouraging to see that about a fifth of students were able to gain all 3 marks on this question. Some others were unable to balance their otherwise correct equation while a small number gave '10 O' instead of '5 O₂'. Students should be reminded of the importance of using letters which are clearly upper case for symbols where appropriate (CO₂, not Co₂) and subscripted numerals (H₂O not H2O).
- (d) Most students were able to attempt this calculation, with a majority of these gaining all three marks. The most common error was to forget that 0.5 litres was being heated. In this case students who showed their working clearly usually gained at least 1 mark.
- (e) (i) Only a very small number of students could give the definition of the watt as the transfer of 1 joule of energy in one second. Most students gave its use as a unit of power.
- (e) (ii) Students found a number of ways to give a satisfactory answer to this question. A formal definition was not required here, unlike (e) (i).

Question 7 (High demand)

Students who did not correctly read the information given in the question often missed the statement that effectively gave them the fact that the allele for polydactyly is dominant.

- (a) About half of students gained both marks, although a quarter gained none.
- (b) (i) Examiners are careful to choose letters with clear differences in upper and lower case form yet some students still manage to form them so carelessly that they confuse themselves. Errors made in (a) were carried forward, meaning that nearly three-quarters of students were able to gain the mark.
- (b) (ii) At this stage of the paper students are expected to use the correct terminology, in this case 'allele'. Lack of understanding was, however, the more usual reason for students failing to gain marks on this question. Careful reading of the information at the beginning of the question ('only one copy of the altered allele is needed to cause polydactyly') means that it **must** be dominant. Students need to be aware that an allele is either dominant or recessive, and cannot be 'more' of either. A dominant allele masks or hides the corresponding recessive allele; it does not 'overpower' it. Many students manipulated the meanings of terms to satisfy their answer. Very few were able to gain any marks for this question.

Question 8 (High demand)

- (a) It was disappointing to see that only just over a third of students were able to answer this question correctly.
- (b) Two thirds of students were unable to answer this question.
- (c) Few students were able to complete this question successfully, with two-thirds gaining no marks. Many of those who attempted it gave the structure of ethane or another alkane as the answer.

Mark Ranges and Award of Grades

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